



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
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**Decision Rationale
Total Maximum Daily Loads
North Fork Beech Creek Watershed
For Acid Mine Drainage Affected Segments
Centre County**

Signed

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I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those waterbodies identified as impaired by the state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety (MOS), that may be discharged to a water quality-limited waterbody without violating water quality standards.

The Pennsylvania Department of Environmental Protection (PADEP), Bureau of Watershed Conservation, submitted the *North Fork Beech Creek Watershed TMDL*, dated January 13, 2005 (TMDL Report), electronically to the U.S. Environmental Protection Agency (EPA) for final Agency review on January 13, 2005, followed by a printed copy which was received January 21, 2005. This report included TMDLs for three metals (aluminum, iron, and manganese) and pH. It addresses one segment on Pennsylvania's 1996 Section 303(d) list of impaired waters, North Fork Beech Creek, which was renumbered and expanded on the 2002 and the proposed 2004¹ Section 303(d) lists of impaired waters.

In 1998, the segment was resurveyed and assigned a new segment id. On the 2002 Section 303(d) list, pH was added and North Fork Beech Creek was again renumbered with segments added including Cherry Run and Little Sandy Run for metals, pH, and other inorganics impairments. An Unnamed Tributary (22789) to North Fork Beech Creek was also added with a separate segment id to the 2002 list for metals and pH impairments. Six additional segments within the North Fork Beech Creek Watershed were added to the proposed 2004 list for metals and pH impairments. PADEP developed TMDLs for metals (*i.e.*, aluminum, iron, and manganese) and pH on North Fork Beech Creek and nine tributaries including Cherry Run, Little Sandy Run, Pancake Run, and six unnamed tributaries. No TMDL is required for other organics (*i.e.*, sulfates) because of a change in water quality standards.

EPA's rationale is based on the TMDL Report and information contained in the attachments to the report. EPA's review determined that the TMDL meets the following eight regulatory requirements pursuant to 40 CFR Part 130.

1. The TMDLs are designed to implement the applicable water quality standards.

¹Pennsylvania's 1996, 1998, and 2002 Section 303(d) lists were approved by the Environmental Protection Agency (EPA). Approval of the 2004 Pennsylvania Integrated Water Quality Monitoring and Assessment Report is pending. The 1996 Section 303(d) list provides the basis for measuring progress under the 1997 lawsuit settlement of *American Littoral Society and Public Interest Group of Pennsylvania v. EPA*.

2. The TMDLs include a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDLs consider the impacts of background pollutant contributions.
4. The TMDLs consider critical environmental conditions.
5. The TMDLs consider seasonal environmental variations.
6. The TMDLs include a MOS.
7. There is reasonable assurance that the proposed TMDLs can be met.
8. The TMDLs have been subject to public participation.

II. Summary

Table 1 presents the 1996, 1998, and 2002 Section 303(d) listing information for the water quality limited segments listed in 1996.

Table 1. 303(d) Sub-List								
State Water Plan (SWP) Subbasin: 09-C Bald Eagle Creek								
Year	Miles	Segment ID	DEP Stream Code	Stream Name	Designated Use	Data Source	Source	EPA 305(b) Cause Code
1996	5.9	7116	22781	North Fork Beech Creek	CWF	305(b) Report	RE	Metals & Other Inorganics
1998	5.96	7116	22781	North Fork Beech Creek	CWF	SWMP	AMD	Metals & Other Inorganics
2002	15.3	New survey; new id. 980609-1400-MAF	22796, 22791 & 22781	Cherry Run, Little Sandy Run, & North Fork Beech Creek	CWF	SWAP	AMD	Metals, Other Inorganics & pH
1996	Not on 1996 303(d) list							
1998	Not on 1998 303(d) list							
2002	0.4	980901-1300-MAF	22789	Unt. North Fork Beech Creek	CWF	SWAP	AMD	Metals & pH

Resource Extraction=RE

Cold Water Fishes = CWF

Surface Water Monitoring Program = SWMP

Surface Water Assessment Program = SWAP

Abandoned Mine Drainage = AMD

The TMDLs were developed using a statistical procedure to ensure that water quality criteria are met 99 percent of the time as required by Pennsylvania's water quality standards at

Pennsylvania Code Title 25, Chapter 96.3(c). Table 3 shows the TMDLs for North Fork Beech Creek.

TMDLs are defined as the summation of the point source WLAs plus the summation of the nonpoint source LAs plus a MOS and are often shown as:

$$\text{TMDL} = \sum \text{WLAs} + \sum \text{LAs} + \text{MOS}$$

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value. Conditions, available data, and the understanding of the natural processes can change more than anticipated by the MOS. The option is always available to refine the TMDL for resubmittal to EPA for approval.

Pennsylvania's Surface Water Assessment Program (formerly the Unassessed Waters Protocol) is PADEP's method of conducting biological assessments of Pennsylvania's waters. PADEP's goal is a statewide assessment of surface waters in Pennsylvania. After completion of the initial assessments, the long-range goal is to reassess all waters on a five-year cycle. Therefore, while the TMDL should not be modified at the expense of achieving water quality standards expeditiously, the TMDL may be modified when warranted by additional data or other information.

III. Background

The North Fork Beech Creek Watershed is located in northcentral Pennsylvania, in the northwestern portion of Centre County. The area within the North Fork Beech Creek Watershed covers approximately 21 square miles with land uses including abandoned mine lands, forest lands, and rural residential properties with small communities scattered throughout the area.

North Fork Beech Creek flows west to east from an elevation of 1500 feet above sea level near its headwaters to an elevation of 1220 feet above sea level at its confluence with South Fork Beech Creek. North Fork Beech Creek joins South Fork Beech Creek to form Beech Creek which discharges to Bald Eagle Creek, a tributary of the Susquehanna River. Named tributaries to North Fork Beech Creek include Cherry Run, Little Sandy Run, and Pancake Run. North Fork Beech Creek is designated for cold water fishes in PA Title 25 Chapter 93.9l.

Multiple seams of coal have been extensively mined in the North Fork Beech Creek Watershed by numerous operators over many decades. The earliest surface mining at or near the North Fork Beech Creek Watershed occurred in the late 1810s. All coal was used locally until 1859 when the Bellefonte and Snow Shoe Railroad was completed enabling the coal to be moved to east coast markets. Early mining involved digging shafts into the coal and mining it. Deep mining later gave way to strip mining of the coal. Past deep mining and strip mining have left deep mine entries, refuse piles, subsidence and pooling areas, altered landscapes which have not

been reclaimed, and the exposure of acid bearing overburden to air and water. These sources have led to the pollution and degradation of the North Fork Beech Creek Watershed.

Recent mining has occurred at six sites within the watershed. The Betz Strip Mine Operation Permit (MDP 4773SM1) was issued to R.S. Carlin Inc., on February 1, 1973. The total affected area was not to exceed 378 acres. The coal seams mined were the Lower Kittanning (16 acres) and Clarion (286 acres) coals. On October 29, 1984, the site was re-permitted as Mine #22 Operation (SMP 14733009, National Pollutant Discharge Elimination System (NPDES) PA0128341) issued to R.S. Carlin, Inc. The total permit area was 646 acres with 305 acres affected. The coal seams mined were the Lower Kittanning (102 acres), Clarion 3 (255 acres), Clarion 2 (255 acres), and Clarion 1 (255 acres) coals. Coal removal and backfill were completed by the fall of 1997 and the site is currently eligible for Stage II Bond Release.

The Robinson Operation (SMP 14840103, NPDES PA0610372) was issued to Chews Contracting Company, Inc., on August 1, 1984. The total permit was 74 acres with 41 acres affected. The coal seam mined was the Clarion (41 acres). Backfilling and reclaiming was completed in September 1995. This site is located near the village of Fountain on the southern side of the North Fork of Beech Creek.

The North Fork Operation (SMP 14820102, NPDES PA0609811) was issued to Johnson and Morgan on October 4, 1984. The total permit area was 392 acres with 235 acres affected. The coal seams mined were the Lower Kittanning (235 acres), Middle Kittanning (135 acres) and Upper Kittanning (51 acres) coals. Mining was completed in June 1992. The site is located on the hilltop northwest of the village of Snow Shoe.

The Morgan Operation (SMP 14960101, NPDES PA0220388) was issued to River Hill Coal Company, Inc., on May 12, 1997. The total permit area was 48.5 acres with 46.3 acres affected. The coal seams mined were the Lower Freeport (1.9 acres), Upper Kittanning Rider (12.8 acres) and Upper Kittanning (15.3 acres) coals. Mining was completed in May 2003. The mine site is located on the hilltop above the headwaters of an unnamed tributary to the North Fork Beech Creek.

The C & K Operation (SMP 14880101, NPDES PA0116220) was issued to PAC Coal Company on September 8, 1988. The total permit area was 43.2 acres with 27.4 total acres affected. The coal seams mined were the Mercer #1 and Mercer #2 (17.7 acres) coals. Coal removal was completed in December 1991 and backfilling was completed in March 1992. This site is located south of the North Fork of Beech Creek.

The CMT Energy Inc., Government Financed Construction Contract (GFCC 14-04-01) was issued in the fall of 2003 and is expected to be active for three years. A total of 7.1 acres are expected to be affected with 2.5 acres of reclamation. With this GFCC, 22,000 tons of coal refuse will be removed. The permit area will use hay bales as a barrier while excavating refuse which will result in no NPDES discharges.

There are currently no active mining operations or permitted point source discharges in the North Fork Beech Creek Watershed. All of the discharges in the watershed are from abandoned mines and will be treated as nonpoint sources.

For purposes of these TMDLs only, point sources are identified as permitted discharge points and nonpoint sources are identified as other discharges from abandoned mine lands which can include tunnel discharges, seeps, and surface runoff. Abandoned and reclaimed mine lands are treated in the allocations as nonpoint sources because there are no NPDES permits associated with these areas. As such, the discharges associated with these landuses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned and reclaimed mine lands does not reflect any determination by EPA as to whether there are unpermitted point source discharges within these landuses. In addition, by approving these TMDLs with mine drainage discharges treated as LAs, EPA is not determining that these discharges are exempt from NPDES permitting requirements. PADEP treats each segment defined by the sampling points as a separate TMDL while EPA, for purposes of the national tracking system, identifies TMDLs for each listed Section 303(d) listed segment. The TMDLs are expressed as long-term averages. See the *North Fork Beech Creek Watershed TMDL Report*, Attachment C, for TMDL calculations.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA, Public Law 95-87) and its subsequent revisions were enacted to establish a nationwide program to, among other things, protect the beneficial uses of land or water resources and public health and safety from the adverse effects of current surface coal mining operations, as well as promote the reclamation of mined areas left without adequate reclamation prior to August 3, 1977. SMCRA requires a permit for the development of new, previously mined, or abandoned sites for the purpose of surface mining. Permittees are required to post a performance bond that will be sufficient to ensure the completion of reclamation requirements by the regulatory authority in the event that the applicant forfeits. Mines that ceased operating by the effective date of SMCRA (often called “pre-law” mines) are not subject to the requirements of SMCRA.

These TMDLs were completed by PADEP to meet the eighth year (2005) TMDL milestone commitment under the requirements of the 1997 TMDL lawsuit settlement agreement. Eighth year milestones include the development of TMDLs for 20 percent of the waters listed on Pennsylvania’s 1996 Section 303(d) list of impaired waters by the effects of acid mine drainage (AMD) or 81 waters since 2003, and 20 percent of waters listed as impaired by non-AMD related impacts or 33 waters since 2003. Delisted waters may count for 20 percent of the requirement.

Computational Procedure

The TMDLs were developed using a statistical procedure to ensure that water quality criteria are met 99 percent of the time as required by Pennsylvania’s water quality standards.

The North Fork Beech Creek Watershed TMDL allocates loading to nine tributaries and three sampling sites along the stream. The nine tributaries include Unnamed Tributary 22797 (NFUT06), Cherry Run (CHRY01), Unnamed Tributary 22795 (NFUT05), Little Sandy Run (LSND01), Unnamed Tributary 22786 (NFUT04), Pancake Run (PNCK01), Unnamed Tributary 22784 (NFUT03), Unnamed Tributary 22783 (NFUT02), and Unnamed Tributary 22782 (NFUT01). Sample sites NFBC03, NFBC02, and NFBC01 are all located on North Fork Beech Creek. Between March 2000 and July 2000, six samples were collected in the North Fork Beech Creek Watershed at each of the sampling points.

A critical flow was not identified, and the reductions specified in this TMDL apply at all flow conditions. Regression and correlation analyses between flow and concentration almost always produce little or no correlation and disclose no critical condition.

TMDLs for each parameter were determined using a Monte Carlo simulation, @RISK,² with the measured, or existing, pollutant concentration data. For each source and pollutant, it was assumed that the observed data are lognormally distributed. Each pollutant was evaluated separately using @RISK.

Using the collected sample concentration parameters, mean and standard deviation, the simulation performs 5000 iterations and predicts an existing long-term average concentration and this analysis shows whether or not the existing data is from a population where water quality standards are exceeded more than one percent of the time. A second simulation of 5000 iterations is performed to calculate the percent reduction necessary to meet the criteria 99 percent of the time. Finally, using the calculated percent reductions, a final simulation is run to confirm that the target value for a long-term average concentration will result in meeting water quality criteria 99 percent of the time.

The existing and allowable long-term average loads were computed using the mean concentration from @RISK multiplied by the average flow. The TMDL Report points out that the loads are being computed based on average flow and should not be taken out of the context for which they are intended, which is to depict how the pollutants affect the watershed and where the sources and sinks are located spatially in the watershed.

IV. Discussions of Regulatory Requirements

EPA has determined that these TMDLs are consistent with statutory and regulatory requirements and EPA policy and guidance.

1). The TMDLs are designed to implement the applicable water quality standards.

²@RISK - Risk Analysis and Simulation Add-in for Microsoft Excel®, Palisade Corporation, Newfield, NY.

Water quality standards are state regulations that define the water quality goals of a waterbody. Standards are comprised of three components, including: (1) designated uses, (2) criteria necessary to protect those uses, and (3) antidegradation provisions that prevent the degradation of water quality. All of the stream segments evaluated in the North Fork Beech Creek Watershed have been designated by Pennsylvania as Cold Water Fisheries with criteria to protect the aquatic life uses. The designations for these stream segments can be found at Pennsylvania Title 25 § 93.91. To protect the designated uses, as well as the existing uses, the water quality criteria shown in Table 2 apply to all evaluated segments. The table includes the instream numeric criterion for each parameter and any associated specifications.

Table 2. Applicable Water Quality Criteria

Parameter	Criterion Value (mg/l)	Duration	Total Recoverable/ Dissolved
Aluminum (Al)	0.75	Maximum	Total Recoverable
Iron (Fe)	1.5 0.3	30-day Average Maximum	Total Recoverable Dissolved
Manganese (Mn)	1.0	Maximum	Total Recoverable
pH	6.0 - 9.0	Inclusive	N/A
Sulfate (SO ₄)	250*	Maximum	Total Recoverable

*Applicable at potable water supply

Pennsylvania Title 25 § 96.3(c) requires that water quality criteria be achieved at least 99 percent of the time, and TMDLs expressed as long-term average concentrations, are expected to meet these requirements. That is, the statistical Monte Carlo simulation used to develop TMDLs and LAs for each parameter results in a determination that any required percent pollutant reduction assures that the water quality criteria will be met instream at least 99 percent of the time. The Monte Carlo simulation used 5000 iterations where each iteration was independent of all other iterations, and the observed data were assumed to be lognormally distributed for each source and pollutant.

EPA finds that these TMDLs will attain and maintain the applicable narrative and numerical water quality standards.

The pH values shown in Table 2 were used as the TMDL endpoints for these TMDLs. In the case of freestone streams with little or no buffering capacity, the allowable TMDL endpoint for pH may be the natural background water quality; these values can get as low as 5.4 (Pennsylvania Fish and Boat Commission). However, PADEP chose to set the pH standard between 6.0 to 9.0, inclusive, which is presumed to be met when the net alkalinity is maintained above zero. This presumption is based on the relationship between net alkalinity and pH, on

which PADEP based its methodology to addressing pH in the watershed. See the *North Fork Beech Creek Watershed TMDL* Report, Attachment B. A summary of the methodology is presented as follows.

The parameter of pH, a measurement of hydrogen ion acidity presented as a negative logarithm of effective hydrogen ion concentration, is not conducive to standard statistics. Additionally, pH does not measure latent acidity that can be produced from the hydrolysis of metals. PADEP is using the following approach to address the stream impairments noted on the Section 303(d) list due to pH. Because the concentration of acidity in a stream is partially dependent upon metals, it is extremely difficult to predict the exact pH values which would result from treatment of AMD. Therefore, net alkalinity will be used to evaluate pH in these TMDL calculations. This methodology assures that the standard for pH will be met because net alkalinity is able to measure the reduction of acidity. When acidity in a stream is neutralized or is restored to natural levels, pH will be acceptable (≥ 6.0). Therefore, the measured instream alkalinity at the point of evaluation in the stream will serve as the goal for reducing total acidity at that point. The methodology that is used to calculate the required alkalinity (and therefore, pH) is the same as that used for other parameters such as iron, aluminum, and manganese that have numeric water quality criteria. EPA finds this approach to pH to be reasonable.

PADEP also has an alkalinity standard. Alkalinity (of a minimum 20 mg/l calcium carbonate except where natural conditions are less) is related to but not identical with pH. Alkalinity is a measure of the buffering capacity of the water. Adequate buffering prevents large swings in pH with additions of small amounts of acid. Although many of the AMD-impacted streams are naturally low in alkalinity, available monitoring data does not always include upstream waters unimpacted by AMD. As PADEP does not list waters for inadequate alkalinity, TMDLs are not being developed for alkalinity but PADEP should monitor the waters for alkalinity and if, after these TMDLs are implemented, alkalinity is less than 20 mg/l or natural conditions, PADEP should list the waters for alkalinity and develop TMDLs.

Although North Fork Beech Creek is listed for other “inorganics” (*i.e.*, sulfate), PADEP recently modified Pennsylvania Code Title 25 § 96.3 to include (d) to limit the application of the sulfate criterion to the point of all existing or planned surface potable water supply. Routine monitoring for AMD-impacted waters includes sulfates and the average sulfate result at NFBC01 at the mouth of North Fork Beech Creek is 122 mg/l and the 99th percentile value is 218 mg/l, which is less than the criterion of 250 mg/l. The TMDL Report identifies the nearest potable water intake as PA American White Deer (PWSID 4490023) located on the West Branch of the Susquehanna approximately 95 miles downstream from the mouth of North Fork Beech Creek. Because of the distance, assimilation capacity, and the criterion is not exceeded at the mouth of North Fork Beech Creek, a TMDL to address sulfates is not necessary.

2). *The TMDLs include a total allowable load as well as individual WLAs and LAs.*

There are no permitted dischargers in the watershed: therefore, the allocations are to nonpoint sources only. For purposes of these TMDLs only, point sources are identified as permitted discharge points and nonpoint sources are identified as other discharges from abandoned mine lands which can include, but are not limited to, tunnel discharges, seeps, and surface runoff. Abandoned and reclaimed mine lands were treated in the allocations as nonpoint sources because there are no NPDES permits associated with these areas. As such, the discharges associated with these landuses were assigned LAs (as opposed to WLAs). The decision to assign LAs to abandoned and reclaimed mine lands does not reflect any determination by EPA as to whether there are unpermitted point source discharges within these landuses. In addition, by approving these TMDLs with mine drainage discharges treated as LAs, EPA is not determining that these discharges are exempt from NPDES permitting requirements.

The LA for each sampling point was computed using water-quality data collected from that point. The instream TMDLs for sampling points NFBC03, NFUT06, CHRY01, NFUT05, LSND01, NFUT04, PNCK01, NFUT03, NFUT02, and NFUT01 consist of LAs made to the area above those points. The instream TMDLs for sampling points NFBC02 and NFBC01 consist of LAs to the area between them and the upstream sample points and upstream load. The sampling points are shown on the map in Attachment A.

Once PADEP determined the allowable concentration and load for each pollutant, a mass-balance accounting was performed starting at the top of the watershed and working down in sequence, see the flow diagram in Attachment A. This mass-balance or load tracking is explained below. Load tracking through the watershed utilizes the change in measured loads from sample location to sample location as a guide for expected changes in the allowable loads.

PADEP used two basic rules for the load tracking between two ends of a stream segment; (1) if the measured upstream loads are less than the downstream loads, it is indicative that there is an increase in load between the points being evaluated and no instream processes are assumed. (2) if the sum of the measured loads from the upstream points is greater than the measured load at the downstream point this is indicative that there is a loss of instream load between the points, and the ratio of the decrease shall be applied to the allowable load being tracked from the upstream point.

Tracking loads through the watershed provides a picture of how the pollutants are affecting the watershed, based on the available information. The analysis is done to insure that water quality standards will be met at all points in the stream. EPA finds this approach reasonable.

Table 3 presents a summary of the allowable loads for the North Fork Beech Creek Watershed. Note the reduction identified for sampling points NFBC02 and NFBC01 are the reductions necessary after upstream reductions have been made.

Table 3. Summary Table for North Fork Beech Creek Watershed

Station	Parameter	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Reduction Identified* %
NFBC03 North Fork Beech Creek Upstream of UNT 22797	Al	0.29	0.05	0	0.05	0.24	83
	Fe	3.54	0.07	0	0.07	3.47	98
	Mn	1.23	0.05	0	0.05	1.18	96
	Acidity	16.20	0.00	0	0.00	16.20	100
	Alkalinity	0.00					
NFUT06 Mouth of UNT 22797	Al	78.2	5.5	0	5.5	72.7	93
	Fe	34.8	11.1	0	11.1	23.7	68
	Mn	58.8	7.6	0	7.6	51.2	87
	Acidity	1,152.7	0.0	0	0.0	1,152.7	100
	Alkalinity	0.0					
CHRY01 Mouth of Cherry Run	Al	31.4	4.1	0	4.1	27.3	87
	Fe	130.4	6.5	0	6.5	123.9	95
	Mn	50.6	4.0	0	4.0	46.6	92
	Acidity	803.3	0.0	0	0.0	803.3	100
	Alkalinity	0.0					
NFUT05 Mouth of UNT 22795	Al	27.7	1.1	0	1.1	26.6	96
	Fe	28.0	2.0	0	2.0	26.0	93
	Mn	34.3	1.4	0	1.4	32.9	96
	Acidity	470.0	0.0	0	0.0	470.0	100
	Alkalinity	0.0					
NFBC02 North Fork Beech Creek Upstream of Little Sandy Run and UNT 22786	Al	16.3	7.2	0	7.2	0.0	0
	Fe	31.9	14.7	0	14.7	0.0	0
	Mn	20.4	12.8	0	12.8	0.0	0
	Acidity	588.3	0.0	0	0.0	0.0	0
	Alkalinity	3.1					
LSND01 Mouth of Little Sandy Run	Al	117.3	10.6	0	10.6	106.7	91
	Fe	162.1	27.6	0	27.6	134.5	83
	Mn	137.5	13.7	0	13.7	123.8	90
	Acidity	1,926.4	0.0	0	0.0	1,926.4	100
	Alkalinity	0.0					
NFUT04 Mouth of UNT 22786	Al	14.7	2.2	0	2.2	12.5	85
	Fe	4.4	2.7	0	2.7	1.7	39
	Mn	7.4	7.4				
	Acidity	70.7	70.7				
	Alkalinity	281.0					
PNCK01 Mouth of Pancake Run	Al	3.0	0.7	0	0.7	2.3	78
	Fe	0.1	0.1				
	Mn	0.9	0.9				
	Acidity	29.8	0.0	0	0.0	29.8	100

Station	Parameter	Existing Load (lbs/day)	TMDL Allowable Load (lbs/day)	WLA (lbs/day)	LA (lbs/day)	Load Reduction (lbs/day)	Reduction Identified* %
	Alkalinity	0.0					
NFUT03 Mouth of UNT 22784	Al	6.8	0.2	0	0.2	6.6	97
	Fe	0.5	0.4	0	0.4	0.1	27
	Mn	3.3	0.3	0	0.3	3.0	92
	Acidity	60.8	0.0	0	0.0	60.8	100
	Alkalinity	0.0					
NFUT02 Mouth of UNT 22783	Al	0.9	0.2	0	0.2	0.7	81
	Fe	0.1	0.1				
	Mn	0.5	0.2	0	0.2	0.3	57
	Acidity	8.4	0.0	0	0.0	8.4	100
	Alkalinity	0.0					
NFUT01 Mouth of UNT 22782	Al	0.03	0.03				
	Fe	0.05	0.05				
	Mn	0.01	0.01				
	Acidity	1.2	0.1	0	0.1	1.1	88
	Alkalinity	0.6					
NFBC01 Mouth of North Fork Beech Creek	Al	226.3	54.3	0	54.3	28.1	34
	Fe	121.8	76.7	0	76.7	0.0	0
	Mn	236.8	54.5	0	54.5	36.7	40
	Acidity	2,914.0	0.0	0	0.0	299.3	100
	Alkalinity	15.7					

LTA = Long Term Average

WLA = point source loads

LA = total nonpoint loads entering segment, including any upstream loads

ND = non detectable

*Reduction required after upstream reductions are made

PADEP allocated only to nonpoint sources as there are no current permitted mining operations in the watershed. Where there are active mining operations or post-mining discharge treatment in the watershed, Federal regulations require that subsequent to TMDL development and approval, point source permitted effluent limitations be water quality-based.³ In addition, PA Title 25, Chapter 96, Section 96.4(d) requires that WLAs shall serve as the basis for determination of permit limits for point source discharges regulated under Chapter 92 (relating to NPDES permitting, monitoring and compliance). Therefore, no new mining may be permitted within the watershed without reallocation of the TMDL.

3). *The TMDLs consider the impacts of background pollutant contributions.*

³It should be noted that technology-based permit limits may be converted to water quality-based limits according to EPA's *Technical Support Document For Water Quality-based Toxics Control*, March 1991, recommendations.

North Fork Beech Creek is located in an area that was extensively mined. The TMDLs were developed using instream data which account for existing background conditions.

4). The TMDLs consider critical environmental conditions.

The reductions specified in this TMDL apply at all flow conditions. A critical flow condition was not identified from the data used for this analysis. The average flow for each sampling site was used to derive loading values for the TMDL.

5). The TMDLs consider seasonal environmental variations.

All sample sets included data points from various seasons which, together with the lack of correlations between flow and concentration, indicate that PADEP considered seasonal variations to the extent that data was available.

6). The TMDLs include a MOS.

The CWA and Federal regulations require TMDLs to include a MOS to take into account any lack of knowledge concerning the relationship between effluent limitations and water quality. EPA guidance suggests two approaches to satisfy the MOS requirement. First, it can be met implicitly by using conservative model assumptions to develop the allocations. Alternately, it can be met explicitly by allocating a portion of the allowable load to the MOS.

PADEP used an implicit MOS in these TMDLs by assuming the treated instream concentration variability to be the same as the untreated stream's concentration variability. This is a more conservative assumption than the general assumption that a treated discharge has less variability than an untreated discharge. By retaining variability in the treated discharge, a lower average concentration is required to meet water quality criteria 99 percent of the time than if the variability of the treated discharge is reduced.

With respect to iron, PADEP identified an additional implicit MOS in the analysis and TMDL development by treating the iron water quality criterion as if the 1.50 mg/l were a maximum value instead of a thirty-day average value.

7). There is reasonable assurance that the proposed TMDLs can be met.

Currently, the Beech Creek Watershed Association is conducting a watershed assessment for the Beech Creek Watershed which includes North Fork Beech Creek as one of its tributaries. All of the tributaries and sources of AMD in Beech Creek Watershed will be evaluated and prioritized based on their severity and flow. The Beech Creek Watershed Association is an active watershed group that is focusing its attention on the top priorities for the watershed. Once the problem areas have been prioritized, the group can then apply for funding to begin the process of cleaning up the watershed.

In addition, the *Recommendations* section highlights what can be done in the watershed to eliminate or treat pollutant sources. Aside from PADEP's primary efforts to improve water quality in the North Fork Beech Creek Watershed through reclamation of abandoned mine lands and through the NPDES permit program, additional opportunities for reasonable assurance exist. PADEP expects activities, such as research conducted by its Bureau of Abandoned Mine Reclamation, funding from EPA's § 319 grant program, and Pennsylvania's Growing Greener program will also help remedy abandoned mine drainage impacts. PADEP also has in place an initiative that aims to maximize reclamation of Pennsylvania's abandoned mineral extraction lands. Through Reclaim PA, Pennsylvania's goal is to accomplish complete reclamation of abandoned mine lands and plugging of orphaned wells. Pennsylvania strives to achieve this objective through legislative and policy land management efforts, and activities described in the TMDL report.

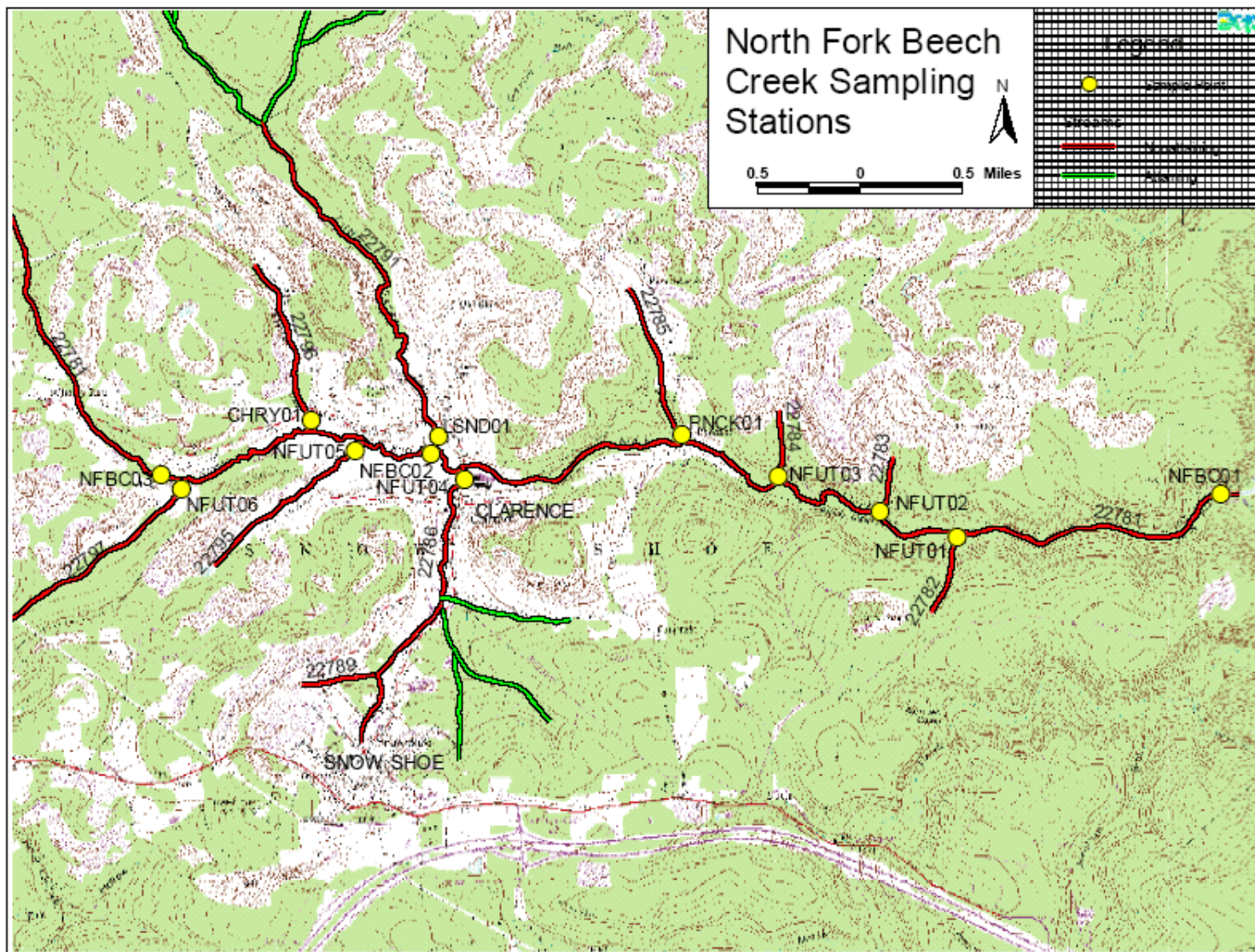
8). *The TMDLs have been subject to public participation.*

A 60-day public comment period was held from November 6, 2004 to January 5, 2005. PADEP public noticed the draft TMDLs in the *Pennsylvania Bulletin* on November 6, 2004 and in the *Centre Daily Times* in State College, Pennsylvania, on November 3 and 10, 2004. A public meeting was held on November 15, 2004 at the Beech Creek Municipal Building in Beech Creek, Pennsylvania, to discuss the proposed TMDLs.

Although not specifically stated in the TMDL Report, PADEP routinely posts the approved TMDL report on their web site: www.dep.state.pa.us/watermanagement_apps/tmdl/.

Attachment A

North Fork Beech Creek Watershed Maps



North Fork Beech Creek Sampling Station Diagram

Arrows represent direction of flow

Diagram not to scale

